

91. (Amended) A method as in claim 90, further comprising pre-oxidizing the elastomeric surface and the second surface prior to the applying step.
92. (Amended) A method as in claim 90, further comprising exposing the elastomeric surface and the second surface to plasma prior to the applying step.
96. (Amended) A method as in claim 90, the applying step comprising contacting first portions of the elastomeric surface with the second surface while leaving a second portion of the elastomeric surface, intervening the first portions of the elastomeric surface, free of contact with the second surface.
97. (Amended) A method as in claim 90, the applying step comprising contacting first portions on the second surface with the elastomeric surface while leaving a second portion of the second surface, intervening the first portions of the second surface, free of contact with the elastomeric surface.
108. (Amended) A method comprising:  
joining a pre-oxidized elastomeric surface, comprising at least one microchannel formed in the elastomeric surface, to a second pre-oxidized surface, wherein the elastomeric surface and the second surface form an irreversible liquid-impermeable seal therebetween.

**REMARKS**

Claims 70-72, 75, 76, 90-92, 96, 97 and 108 have been amended to recite, in part, an elastomeric surface and this amendment is supported throughout the specification, for example at page 12, lines 1-12. Claims 70 and 90 have been amended to recite, in part, an irreversible liquid-impermeable

seal and a microfluidic structure. These amendments are supported throughout the specification, for example, at page 18, lines 19-29 and page 12, line 30 through page 14, line 26, respectively. Claims 73, 74, 94, 95, 109 and 110 have been cancelled without prejudice claims. Claims 70-72, 75-78, 90-93, 96-98, and 108 remain.

Priority

The Applicants do not agree with the statement regarding priority. The claims, as amended herewith, are believed to be supported under 35 U.S.C. §112 by provisional application serial no. 60/078,985, filed March 23, 1998. For example, with reference to claim 70, as amended, application 60/078,985 specifically or inherently discloses joining a pre-oxidized elastomeric surface to a second pre-oxidized surface and forming an irreversible liquid-impermeable seal therebetween in a microfluidic structure.

Rejection of Claims 70-78, 90-98 and 109-110 under 35 U.S.C. §112, first paragraph

Applicants disagree with the Examiner's assertion that the limitation "absent sufficient pressure to deform the polymeric surface" is not supported by the specification or is indefinite. However, in the interest of expediting examination, this limitation has been removed without prejudice from claims 70 and 90.

Similarly, Applicants disagree with the Examiner's assertion that the limitation "absent sufficient pressure to collapse the microchannel" is not supported by the specification or is indefinite. However, in the interest of expediting examination, claims 109 and 110 have been cancelled, without prejudice.

In view of the amendments to claims 70 and 90, and the cancellation of claims 109 and 110, it is believed that the rejection on this ground has been overcome, and it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 70-78, 90-98 and 109-110 under 35 U.S.C. §112, second paragraph

In view of the amendments to claims 70 and 90, and the cancellation of claims 109 and 110, it is believed that the rejection on this ground has been overcome, and it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 70-78, 90-98 and 108-110 under 35 U.S.C. §102(a)

Reconsideration of the above claims under 35 U.S.C. §102(a) as being anticipated by Duffy et al. is respectfully requested. As noted above, it is believed that the claims, as amended, are supported under 35 U.S.C. §112 by Provisional Application Serial No. 60/078,985, filed March 23, 1998, antedating Duffy et al.

On this basis, it is believed that the rejection on this ground is improper, and it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 70-74, 77-78, 90-95, and 98 under 35 U.S.C. §102(b)

Reconsideration is requested of the above claims under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,647,939 (Gee).

Each independent claim, as amended, recites either a "microfluidic structure," or a "microchannel," not found in Gee. On this basis, it is believed that the rejection on this ground has been overcome, and it is respectfully requested that the rejection be withdrawn.

Rejection of Claims 75, 76, 96, 97, 108-110 under 35 U.S.C. §103(a)

Reconsideration is requested of the above claims under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,942,433 (Parce) in view of Gee.

Claims 75, 76, 96, 97 depend from and contain the limitations of other claims that do not stand rejected on this ground, thus it is believed that the rejection of those claims is improper. Notwithstanding this, the Applicant's remarks below are applicable to these claims as well.

Parce describes "natural adhesion" in the context of joining one component to another component to form a device including channels. This would be understood, by those of

ordinary skill in the art, to be a *reversible* adhesion, in the context relative to the “irreversible” liquid-impermeable seal recited in all independent claims of the present application, as amended.

Gee appears to wish to form an overall seal between the interior flange of a cap that covers a container, and the top rim of the container itself. Gee positions a gasket (septum), through which a needle can be passed, between the interior flange of the cap (15) and the top rim of the container. While Gee states that a “seal” is formed between the gasket and the interior flange, and he characterizes the seal as “liquid tight,” it is not seen how assessment of this seal, or its reversibility or irreversibility, is relevant or helpful, or could even be carried out. Instead, what would seem to be required, upon a reading of Gee, would be a liquid-tight seal *between the gasket and the top of the container*, without which it would appear that fluid would leak from the container. It would appear that to prevent leakage of fluid between the top of the container and the bottom of the septum, the cap would need to be attached to the container in some manner so as to form pressure between the top of the container and the septum, which also would form pressure between the top of the septum and the interior of flange 15 (which would seem to serve no purpose other than as counter-pressure to drive the septum downward against the top of the container to form the important seal).

That is, given the seal necessarily inherently formed between the septum and the top rim of the container (which, if absent, would result in leakage from the container between the rim and the septum), it is not seen how one could even evaluate whether any seal is formed between the top of the septum and the interior flange of the cap, with or without application of pressure. It would appear that those of ordinary skill in the art, reading the disclosure of Gee, would not consider relevant whether the interaction between the top of the septum and the interior flange of the cap would or would not form a seal, and whether, if any such seal were formed, it would be reversible or irreversible.

Given the arrangement of Gee, and what would appear to be a meaningless description of the interaction between Gee’s cap flange and septum, and given no apparent inadequacy of the arrangement of Parce as disclosed in Parce or Gee, it is not seen where motivation would

exist for those of ordinary skill in the art to look to Gee to modify any arrangement of Parce, and any such combination would appear to be the result of impermissible hindsight based upon a reading of the Applicant's own disclosure.

Accordingly, it is believed that the rejection on this ground has been overcome, and it is respectfully requested that the rejection be withdrawn.

### CONCLUSION

In this response several amendments have been made to the claims to expedite prosecution. It is to be understood that the Applicants do not necessarily believe all current limitations in all claims to be strictly necessary to distinguish the prior art, and notice is given that the Applicants may pursue claims of different scope, potentially broader in some or all aspects, in this or a continuing application.

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below. If there is a fee occasioned by this response that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,  
*Olivier J.A. Schueller et al., Applicants*

By: 

Timothy J. Oyer, Ph.D., Reg. No. 36,628  
Lisa E. Winsor, Reg No. 44,405  
Wolf, Greenfield & Sacks, P.C.  
600 Atlantic Avenue  
Boston, Massachusetts 02210-2211  
Telephone: (617) 720-3500

Docket No. H00498.70084.US

Date: March 5, 2003

xNDD

**MARKED-UP CLAIMS**

70. (Amended twice) A method comprising:

joining a pre-oxidized [polymeric] elastomeric surface to a second pre-oxidized surface, wherein the [polymeric] elastomeric surface and the second surface form [a] an irreversible liquid-impermeable seal therebetween in a microfluidic structure [absent sufficient pressure to deform the polymeric surface].

71. (Amended twice) A method as in claim 70, comprising joining the [polymeric] elastomeric surface and the second surface to form [a] an irreversible liquid-impermeable seal therebetween in the absence of auxiliary adhesive.

72. (Amended) A method as in claim 70, further comprising pre-oxidizing the [polymeric] elastomeric surface and the second surface by exposing the [polymeric] elastomeric surface and the second surface to plasma.

75. (Amended) A method as in claim 70, wherein the joining step comprises joining first portions of the [polymeric] elastomeric surface to the second surface while leaving a second portion of the [polymeric] elastomeric surface, intervening the first portions of the [polymeric] elastomeric surface, free of contact with the second surface.

76. (Amended) A method as in claim 70, the joining step comprising contacting first portions of the second surface with the [polymeric] elastomeric surface while leaving a second portion of the second surface, intervening the first portions of the second surface, free of contact with the [polymeric] elastomeric surface.

90. (Amended twice) A method comprising:

applying [a polymeric] an elastomeric surface to a second surface in the absence of auxiliary adhesive and at a temperature of between about 16 °C and about 27 °C, wherein the [polymeric] elastomeric surface and the second surface bond to form [a] an irreversible liquid-

impermeable seal therebetween in a microfluidic structure [absent sufficient pressure to deform the polymeric surface].

91. (Amended) A method as in claim 90, further comprising pre-oxidizing the [polymeric] elastomeric surface and the second surface prior to the applying step.

92. (Amended) A method as in claim 90, further comprising exposing the [polymeric] elastomeric surface and the second surface to plasma prior to the applying step.

96. (Amended) A method as in claim 90, the applying step comprising contacting first portions of the [polymeric] elastomeric surface with the second surface while leaving a second portion of the [first] elastomeric surface, intervening the first portions of the [polymeric] elastomeric surface, free of contact with the second surface.

97. (Amended) A method as in claim 90, the applying step comprising contacting first portions on the second surface with the [polymeric] elastomeric surface while leaving a second portion of the second surface, intervening the first portions of the second surface, free of contact with the [polymeric] elastomeric surface.

108. (Amended) A method comprising:

joining a pre-oxidized [polymeric] elastomeric surface, comprising at least one microchannel formed in the [polymeric] elastomeric surface, to a second pre-oxidized surface, wherein the [polymeric] elastomeric surface and the second surface form [a] an irreversible liquid-impermeable seal therebetween.